

WHAT IS CLAIMED IS:

1. An induction heating roller device comprising:
 - an induction coil unit having a primary coil; and
 - 5 a hollow heating roller having a secondary coil coupled to the primary coil of said induction coil unit through a coreless transformer coupling and having a secondary resistance value substantially equal to a secondary reactance, said heating roller being rotatably supported.
- 10 2. The induction heating roller device according to claim 1, wherein:
 - said secondary coil has a closed circuit.
- 15 3. The induction heating roller device according to claim 1, wherein:
 - said induction coil unit includes a wire pair leading from said primary coil; and
 - a capacitor connected between said wire pair in close proximity to said primary coil.
- 20 4. The induction heating roller device according to claim 3, wherein:
 - said primary coil includes a plurality of primary coil components dispersedly located along an axis of said heating roller and connected between said wire pair; and
 - said capacitor includes a plurality of capacitor components connected between said wire pair in close proximity to said plurality of primary coil components, respectively.
- 25 5. The induction heating roller device according to claim 1, wherein:
 - said heating roller has an outermost circumferential periphery covered with a layer of plastic resin.
- 30 6. An induction heating roller device comprising:
 - an induction coil unit having a primary coil;
 - a hollow heating roller having a secondary coil coupled to the primary

coil of said induction coil unit through a coreless transformer coupling and having a secondary resistance value substantially equal to a secondary reactance, said heating roller being rotatably supported; and

5 a power supply including a high frequency inverter composed of switching elements including uni-pole elements for producing a high frequency output of a frequency more than 1.1 MHz to energize the primary coil of said induction coil unit.

10 7. An induction heating roller device comprising:

15 an induction coil unit having a primary coil with a mid point thereof being connected to the ground;

20 a hollow heating roller having a secondary coil coupled to the primary coil of said induction coil unit through a coreless transformer coupling and composed of a closed circuit, said secondary coil having a secondary resistance value substantially equal to a secondary reactance, said heating roller being rotatably supported;

25 a power supply for energizing the primary coil of said induction heating coil unit; and

30 a smoothing circuit interposed between said induction coil unit and said power supply unit.

25 8. The induction heating roller device according to claim 7, wherein:

35 said induction coil unit includes a heat conducting path located at one end of said heating roller and composed of a ground connection path leading from a mid point of said primary coil.

30 9. An induction heating roller device comprising:

35 an induction coil unit including a core made of a body and a flange integral with at least one end of the body, which are made of magnetic material, and a primary coil wound around an outer circumferential periphery of said body; and

40 a hollow heating roller including a secondary coil formed in a closed circuit and having a plurality of component layers, which are laminated into a

concentric relationship, whose at least one layer is made of an electrically conductive, magnetic material, to allow the inductive coil unit to be internally inserted for permitting the electrically conductive, magnetic material to be coupled to the primary coil of the induction coil unit through a transformer coupling, the secondary coil having a secondary resistance value substantially equal to a secondary reactance.

10. A heating roller for an induction heating roller device, said heating roller comprising:

10 a hollow roller base body made of electrically non-conductive material;

and

15 a plurality of secondary coil components composed of respective closed circuits circumferentially wound around said roller base body and dispersedly located along an axis of said roller base body.

20 11. The heating roller for an induction heating roller device according to claim 10, wherein:

25 said secondary coil components are located on an outer circumferential wall of said roller base body.

12. The heating roller for an induction heating roller device according to claim 10, wherein:

25 each of said plurality of secondary coil components includes a coil component of a single turn.

25 13. The heating roller for an induction heating roller device according to claim 10, further comprising:

30 a thermal conducting element extending across said plurality of secondary coil components and coupled thereto in thermal conductive relationship.

14. The heating roller for an induction heating roller device according to claim 13, wherein:

5 said thermal conducting element includes an electrically conducting element.

10 15. A heating roller for an induction heating roller device, said heating roller comprising:

15 a hollow roller base body made of electrically insulating material; and
20 a plurality of secondary coil components composed of respective closed circuits circumferentially wound over a whole surface of said roller base body along an axis of said roller base body.

25 16. The heating roller for an induction heating roller device according to claim 10, wherein:

30 said secondary coil components are formed by electrically conductive films, respectively.

35 17. A fixing apparatus comprising:

40 a fixing frame body including a pressure roller; and
45 an induction heating roller device including a heating roller held in pressured contact with said pressure roller to allow record medium, which is adhered with toner image, to be transferred through said both rollers for thereby causing said toner image to be fixed to said record medium;

50 wherein said induction heating roller device includes an induction coil unit having a primary coil, and a hollow heating roller having a secondary coil coupled to the primary coil of said induction coil unit through a core-less transformer coupling and having a secondary resistance value substantially equal to a secondary reactance, said heating roller being rotatably supported.

55 18. A fixing apparatus comprising:

60 a fixing frame body including a pressure roller; and
65 an induction heating roller device including an induction coil unit having a primary coil, a hollow heating roller held in pressured contact with said pressure roller to allow record medium, which is adhered with toner image, to be transferred through said both rollers for thereby causing said toner image to be fixed to said record medium;

wherein said hollow heating roller includes a secondary coil coupled to the primary coil of said induction coil unit through a core-less transformer coupling and having a secondary resistance value substantially equal to a secondary reactance, said hollow heating roller being rotatably supported; and

wherein said induction heating roller includes a hollow roller base body made of electrically non-conductive material, and a plurality of secondary coil components composed of respective closed circuits circumferentially wound around said roller base body and distributed along an axis of said roller base body.

19. An image forming machine comprising:

an image forming frame body including an image forming unit for forming toner image on record medium; and

a fixing unit mounted in said body for causing said toner image to be fixed to said record medium;

wherein said fixing unit includes a body having a pressure roller, and an induction heating roller device including a heating roller held in pressured contact with said pressure roller to allow said record medium, which is adhered with said toner image, to be transferred through said both rollers for thereby causing said toner image to be fixed to said record medium; and

wherein said induction heating unit includes an induction coil unit having a primary coil, and a hollow heating roller having a secondary coil coupled to the primary coil of said induction coil unit through a core-less transformer coupling and having a secondary resistance value substantially equal to a secondary reactance, said heating roller being rotatably supported.

20. An image forming machine comprising:

an image forming frame body including an image forming unit for forming toner image on record medium; and

a fixing unit mounted in said body for causing said toner image to be fixed to said record medium;

wherein said fixing unit includes a body having a pressure roller, and

an induction heating roller device including a heating roller held in pressured contact with said pressure roller to allow record medium, which is adhered with said toner image, to be transferred through said both rollers for thereby causing said toner image to be fixed to said record medium; and

5 wherein said induction heating roller includes a hollow roller base body made of electrically non-conductive material, and a plurality of secondary coil components composed of respective closed circuits circumferentially wound around said roller base body and distributed along an axis of said roller base body.

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